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The major objective of the Study of Curriculums for Occupational Preparation and Education (SCOPE) is to coordinate and contribute to national curriculum development at the secondary school level. SCOPE programs attempt to increase the relevance of high school education for the majority of students who must seek employment or further job training upon graduation. This progress report outlines recent accomplishments toward the initial phase project goals which include: (1) Establishing communication among the State-supported vocational curriculum development centers; and (2) developing a model for classifying educational objectives in terms of performance requirements and objectives rather than subject matter. The classification task required specification of behavioral objectives within the cognitive, affective, perceptual, and psychomotor domains. The appendix includes: (1) Definitions of classification model categories; (2) sample student performances for classification model categories; and (3) questions which will be used in the future SCOPE study on the effects of ability grouping in the public schools. Related documents are ED 027 438 and EA 002 491. (JH)

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PROGRESS REPORT 3

Project No. 8-0334
Grant No. OEG-0-8-080334-3736 (085)

A STUDY OF CURRICULUMS FOR OCCUPATIONAL PREPARATION AND EDUCATION.
(Scope Program: Phase I)

Bruce W. Tuckman

Rutgers University
New Brunswick, New Jersey

April, 1969

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION

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A research Activity of
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New Brunswick, New Jersey

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Special thanks go to Mrs. Carol Porter and Mr. Ricardo Grippaldi, research assistants, who prepared major sections of this report.

Last but not least, Mr. Joseph H. Casello, Assistant to the Director, has earned a debt of thanks for taking the responsibility for the preparation of this report.

PREFACE

SCOPE is an acronym for the Study of Curriculums for Occupational Preparation and Education. Its major objective is to coordinate and contribute to a national curriculum development effort at the secondary school level aimed at increasing the relevance of high school education for the large majority of our youth who must seek employment or further job training upon graduation.

The first phase of the SCOPE Program is CONECT, an acronym standing for the Coordination of Occupational and Non-occupational Curriculums and Technologies. The objectives of this first phase are as follows:

(1) To establish a functional communication link among the state-supported vocational curriculum development centers;

(2) to increase the familiarity of the directors of the above centers with recent advances in behavioral approaches to curriculum development devices, and evaluation;

(3) to refine and test a scheme for classifying educational objectives in terms of the performance requirements and objectives rather than the subject matter; and

(4) to develop a detailed plan of activity for Phase II of the SCOPE Program, including the identification of staff and facility needs.

The SCOPE Program has aims which interface with those of a new Federally supported effort known as the Educational Systems of the '70's. The ES '70 program is an attempt to make an impact on the high school of the future by providing more closely for individual student needs, including those relevant to future employment opportunities. The notion of the truly integrated curriculum, i.e., one in which concepts common to different subject matters become the core of a curriculum rather than organizing the curriculum completely around the subject matters themselves, is at the heart of ES '70. It is here that the activities of SCOPE, as well as other University projects, will contribute to the overall programmatic approach. During the first phase of SCOPE, a process-object model for the integration of objectives will be refined, written about, and tested. In so doing, the SCOPE Program will be helping to provide the basis for a highly individualized and reality-oriented curriculum.

OF BUREAU OF RESEARCH NO. 8-0334

GRANT NO. OEG-0-8-080334-3736 (085)

RUTGERS UNIVERSITY

DATE OF SUBMISSION:

A STUDY OF CURRICULUMS FOR OCCUPATIONAL PREPARATION AND EDUCATION (SCOPE PROGRAM: PHASE I)

April 28, 1969

BRUCE W. TUCKMAN

I. MAJOR ACTIVITIES AND ACCOMPLISHMENTS DURING THIS PERIOD

A major portion of our efforts during this reporting period continued to be directed toward accomplishing our two major goals:

1. To effect a viable communication network, possibly a formal organization, among a group of designated state-supported vocational curriculum development laboratories, and

2. to develop and test a classification system into which all behavioral objectives can be put to produce a process by which learning can take place.

A. State-supported curriculum development laboratories

Our first conference for curriculum laboratory directors was scheduled for this reporting period (March 6-7), but had to be postponed until late March owing to a conflict with another Federally-sponsored curriculum development conference. A complete commentary on this conference, therefore, must wait until the next progress report. It can be stated at this point, however, that the conference will include fifteen laboratory directors, a representative from the Federal Office of Education, and staff members from the Vocational-Technical Department here at Rutgers University. We anticipate a most productive two days.

B. The Classification Model

Work on the classification model has reached the

final stages of Phase I: a review of the relevant literature and a determination of the domains and processes to be included in the model. Mr. Ricardo Grippaldi, our graduate research assistant working on the model development, has submitted the following report as a summary of our work on the model during this period.

THE DEVELOPMENT OF A MODEL FOR BEHAVIORAL OBJECTIVES

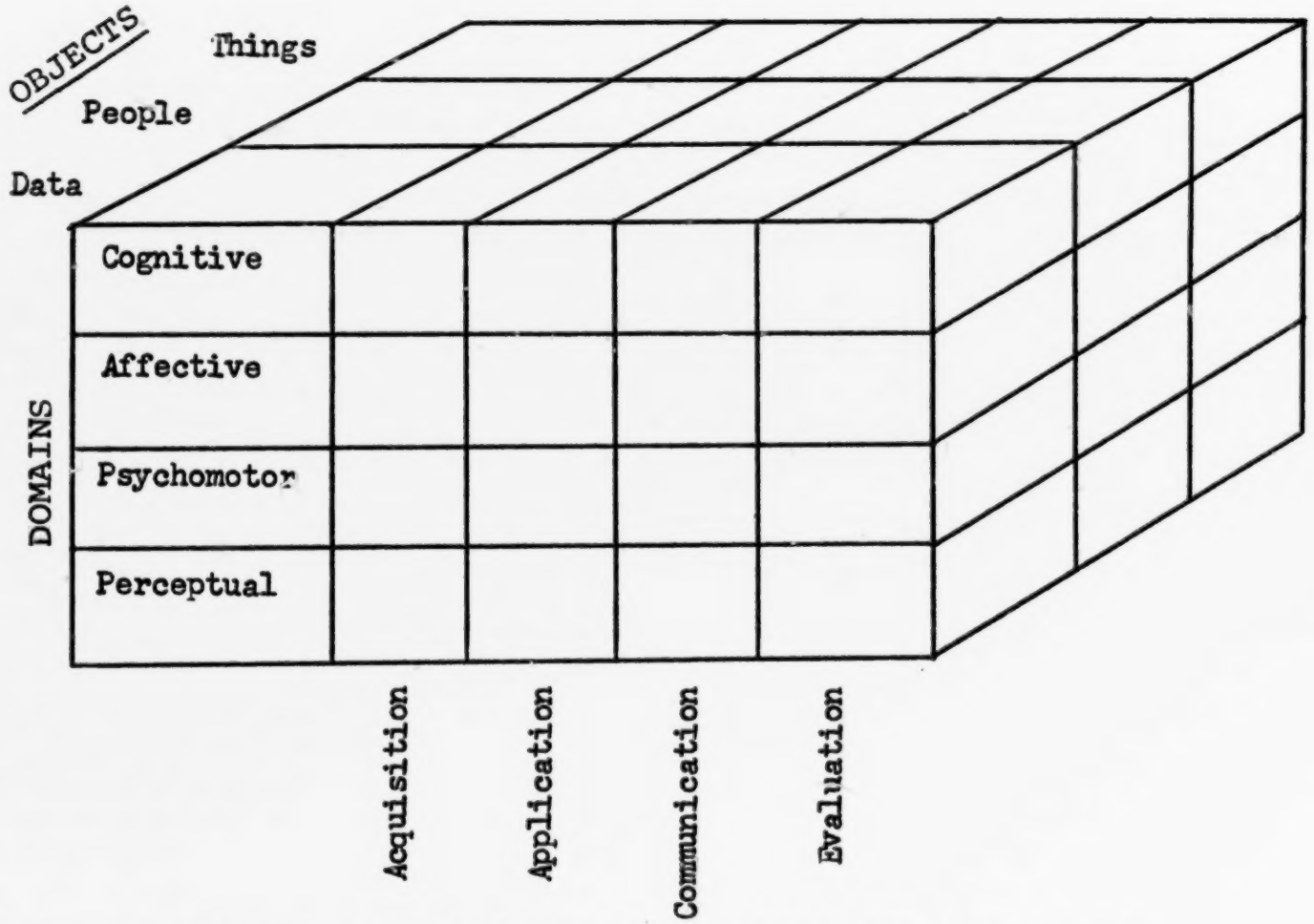
Our work on the development of a workable taxonomy of behavioral objectives was concentrated during this quarter on a continuing review of the literature for pertinent resources applicable to our work, and utilizing the categories developed in Model IV (See Figure 1). A decision was made against using the solitary participant game as a means by which to study problem-solving processes owing to the difficulty in adequately defining the tasks involved in such processes.

An attempt was made to determine the operations appropriate to each cell in our taxonomy model. A listing of such activities was developed for the cognitive, affective, perceptual and psychomotor domains. This included the processes of acquisition, application, evaluation, and communication (See Appendices A & C). Modifications in these areas led to Model V (See Figure 2) which was felt to incorporate the basic components involved in each of the above-mentioned areas. Operational definitions of these components were then developed (See Appendix A), using pertinent tasks as the basis for definitions. (Representative examples of these definitions are listed in Appendix B.)

A decision was made to concentrate our investigation at this time primarily on the cognitive domain since it is believed to be the most important of the four areas, and probably the basic building block of the taxonomy. Psychological definitions and prototypic tasks of the components of cognition have been evolved (and will be reported in the next progress report), and an evaluation of them will continue into the next quarter. In addition, an attempt will be made to catalog psychological tasks which are representative of the operations involved in the various components.

Figure 1

MODEL IV



Step 1. analyze a terminal objective into its components

Step 2. classify each component in one of the above 48 cells

FIGURE 2

Model V

DOMAINS \ PROCESSES	Acquisition	Application	Evaluation	Communication
Perceptual	acuity sensing attention scan	detecting distinguishing identifying	observing comparing kinestheticing	discriminating
Cognitive	memorizing associating conceptualizing processing	computing ordering troubleshooting decision-making problem-solving	diagnosing	coding speech writing translating
Affective	attitude formation value formation	feeling emoting	judging	persuading stimulating
Psychomotor	learning	affecting constructing	templating	training

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C. Ability Grouping Study

Much progress was made during this third quarter concerning our investigation of ability grouping practices in the public schools. In February, initial contact was made with a local board of education. Members of the SCOPE staff attended a meeting with members of the board in order to present and explain the format for our project. We presented the board members with a list of questions on ability grouping (See Appendix D). These questions were to determine what data we would collect at the school. After some discussion and exchange of ideas, it was decided that another meeting would be arranged between ourselves and the school principal, members of the guidance staff, and the head of data-processing at the high school.

At that meeting, the research idea was presented once again, and questions were entertained. The heads of the guidance and data processing departments agreed to work closely during the data collection phase of the project with Mrs. Carol Porter, the SCOPE graduate assistant working on this study. It was also agreed that any results that are obtained at the completion of the study will be furnished to staff and faculty of the high school and members of the board of education.

At the present time, almost all of the initial data has been amassed. First, data-processing equipment was used to randomly select a sample of approximately 200 11th and 12th grade students. Students were selected from each section of junior and senior English, since this department most finely differentiated their courses. All present courses for each student in the sample were then printed out. From this information, we can get an idea of how much grouping is done and whether it is administered across subject matter. In other words, are the same students in the same groups (i.e., course levels) in different subjects? Also, by obtaining the course schedules of the seniors in their junior year (1967-68), we shall be able to make an estimate of how flexible the grouping procedures are (i.e., has the student moved from one group to another over time with subject matter constant?). Attendance records and standardized test scores were also examined for the entire sample in order to be able to examine the compositions of the different ability groups in each department.

The records of those students who "dropped-out" of

school after their junior year were also examined. It is our intention to compare these with the junior year records of present seniors in our sample.

The next step will be to arrange a meeting with the department heads of the school. At this time, we will try to obtain a description of grouping procedures from their point of view. Also, whether or not different groupings of a subject at a particular grade level truly involve real differences (i.e., in material presented, the speed with which it is covered, etc.).

After all the data has been collected, the project will proceed into the next phase — data analysis. It is hoped that many of the questions will be fruitfully answered at that time.

D. The Student-Centered Curriculum

As a result of a meeting in Washington with officials from the U.S. Office of Education, Division of Comprehensive and Vocational Education Research, a position paper has been prepared on the topic, "The Student-Centered Curriculum" (SCOPE Incidental Report #2). This type of thinking is more in line with the nature of the project, and perhaps more acceptable to those who question the role (or lack of it) of the students in our tentative curriculum design.

E. Visitations

Two valuable visitations were made during this quarter. On January 28, 1969, Dr. Tuckman and Mr. Casello journeyed to Hackensack, New Jersey, to meet with Mr. Irving Moscowitz, the vocational coordinator in that school system. Mr. Moscowitz has developed a coordinated Industrial Preparation Program. This program involves an integration of a number of disciplines, such as physics, biology, English, with vocational education in what Mr. Moscowitz describes as an attempt to "revise the curriculum to meet the needs of the students rather than transforming the students to meet the curriculum." Average ability students are grouped with potential dropouts and those disinterested in school in a program which applies a most practical approach to learning. Various topics from the world of work, such as a study

of heating ducts, are selected and become the theme around which the curriculums in the various disciplines mentioned above are built. Course content is geared to the relevancy of the real world, student interest, and the development of good work habits.

The program has also included a course in which potential school dropouts came together daily at the high school during the summer months to build a storage shed for school maintenance equipment. A shop teacher and a member of the math department were hired to teach the course. The math that was presented during the course was done so in terms of that needed to construct the shed. Mr. Moscowitz deemed the project a huge success.

E. Visitations (continued)

January 22 found Dr. Tuckman and his assistant traveling to Trenton, New Jersey, where they enjoyed an opportunity to see the Technology For Children Project in action. This is a program in which elementary school children are exposed to the world of work through the study of various occupations, the construction of various items of interest, from minature rockets to log cabins, and the operation of small hand and power tools. Math, English, science, and other skills are taught as the need for such knowledge arises during the construction phase of the program. Two classrooms were visited, one in a suburb of Trenton, and one in the very heart of that city. This afforded us an opportunity to observe the effect of the project on students of varying socio-economic backgrounds.

As mentioned, both of these visitations were most valuable learning experiences in that they provided us with examples of what can be accomplished with an integrated curriculum when it is relevant and meaningful to students. Dr. Fred Dreves, the Director of the Project, has also accepted an invitation to speak at our May conference.

F. Conferences

Mr. Walter Brown, a doctoral candidate in vocational-technical education here at Rutgers University, represented SCOPE at the National Conference on Evaluating Vocational

and Technical Education Programs. This conference, sponsored jointly by the W.E. UpJohn Institute for Employment Research, the American Association of Junior Colleges, and the American Vocational Association, and held in Atlantic City, New Jersey, from October 6 to 9, was an attempt to acquaint interested persons with recent methods of evaluating vocational education. Papers were presented on a variety of evaluative techniques, such as the follow-up study, standardized achievement tests, industry-advisory committees, state and national licensing examinations, and the use of regional accrediting associations.

While reporting the conference to be most interesting and enlightening, Mr. Brown was also quick to point out the almost complete absence of behavioral objectives as a means of evaluating vocational programs. Thus, while the program was not directly valuable to our particular endeavors, it did perhaps suggest to us a very obvious need for the type of work that we are doing.

II. PROBLEMS

None

III. SIGNIFICANT FINDINGS AND EVENTS

See Section I

IV. DISSEMINATION ACTIVITIES

More than 150 copies of the SCOPE Progress Report #2 have been distributed to interested persons. Incidental Report #2, "The Student-Centered Curriculum," will be widely distributed. Mr. Casello continues to fill requests for a speaker on our work. In addition, press releases disseminated to announce our spring conferences have and will continue to serve as a source of information concerning SCOPE.

V. CAPITAL EQUIPMENT ACQUISITIONS

None

VI. FORMS

None

VII. OTHER ACTIVITIES

See Section I

VIII. STAFF SUMMARY

		Federal	Local	
Bruce W. Tuckman	Director	$1,926	$566	1/1-3/31 3/4 time
Joseph H. Casello	Assist. Dir.	2,924		1/1-3/31 full time
Ricardo Grippaldi	Res. Assist.	275		1/1-3/31 1/2 time
Carol Porter	Res. Assist.	275		1/1-3/31 1/2 time

IX. FUTURE ACTIVITIES PLANNED FOR NEXT REPORTING PERIOD

The final report for the first year of SCOPE's existence will concentrate on presenting:

1. A summary of a year of work on the development of a model for processing behavioral objectives,

2. a final report on our study of ability grouping in the public schools, and

3. a summation of our coordinating activities with the curriculum development laboratories, including a detailed report on our two conferences.

These three areas in themselves will constitute a report of major proportion.

X. CERTIFICATION

Signature of Contract Officer	Signature of Principal Investigator or Project Director
Date	Date

APPENDICES

APPENDIX A

Definitions of Classification Model Categories

COGNITIVE

Acquisition

memorizing	-	retention of input into mind
associating	-	uniting (combining) with others
conceptualizing	-	creating mental representation
processing	-	continuing operation of (mental) manipulation of input

Application

computing	-	determining by processing
ordering	-	classification (categorizing) of mental representations
troubleshooting	-	locating causes of malfunctions and repairing them
decision-making	-	concluding
problem solving	-	determining solution to

Evaluation

diagnosing	-	reaching a decision concerning causes of malfunctioning

Communication

coding	-	put into symbols

Communication (continued)

speech writing - vocalization of cognitive evaluations

translating - to turn mental cognition into observable form

PERCEPTION

Acquisition

acuity - sharpness of vision (and other senses)

sensing - awareness of stimulation

attention - focusing of sensing on particular stimuli

scan - examining part by part

Application

detecting - discover the existence of

distinguishing - perceive one thing from or among others

identifying - to make to be the same

Evaluation

observing - take notice of

comparing - examining the qualities of, to determine similarities and/or differences

"kinestheticing" - sensing of internal sensations

Communication

discriminating - discerning differences

AFFECTIVE

Acquisition

attitude formation - evolving of a feeling or mood regarding a subjective object

value - place on a scale, estimate subjective weight

Application

feeling - emotional responding

emoting - expression of feeling

Evaluation

judging - subjective decision

Communication

persuading - convincing others to accept one's own attitudes or intended behavior

stimulating - inducing in others emotional feelings

PSYCHOMOTOR

Acquisition

learning - receiving and retaining information concerning manipulative skills

Application

effecting - changing the environment by manipulating it

constructing - assembling materials

Evaluation

templating - judging the correctness or dimensions of a physical object by the use of manipulative measures

Communication

training - teaching psychomotor skills with varying degrees of direct intentionality of purpose

APPENDIX B

Sample Performances for Classification Model Categories

COGNITION

Acquisition

memorizing	-	recite the Gettysburg address
associating	-	name the drive train components of an auto
conceptualizing	-	make up universal symbols for the 4 basic elements
processing	-	read this paragraph and then answer the following questions based on it

Application

computing	-	list the lowest common denominators for each of these fractions
ordering	-	name the top 5 auto components essential for transportation
troubleshooting	-	repair this soundless TV
decision-making	-	What personal characteristics are needed for good citizenship?
problem solving	-	give the chemical composition of this solution

Evaluation

diagnosing - compare the similarities and differences of the League of Nations versus the United Nations

Communication

coding - program the monthly journal entries

speech writing - name 5 alternatives to continuing the current traditional school curriculum

translating - write a precis of 100 words on how to avoid college riots

AFFECTIVE

Acquisition

attitude formation - after viewing this film, describe what the people think about each other, according to their behavior

value - rank the relative importance of each of these 20 personal characteristics

Application

feeling - describe your reaction to draft-dodgers

Application (continued)

emoting - role play your own mother in the family situation

Evaluation

judging - nominate your choice for student president and Homecoming Queen, and tell why

Communication

persuading - have your class committee adopt your above choices

stimulating - facilitate the pace and probing of the panel's racial discussion

PERCEPTION

Acquisition

acuity - note the details of this virus slide

sensing - memorize the tactile qualities of this model

attention - count the number of flashing red lights in this apparatus

scan - list all man-made objects in this photo

Application

detecting - what engine parts are missing in this diagram?

Application (continued)

distinguishing - which TV is the sharpest?

identifying - what properties do these three carburetors have in common?

discriminating - which engine is tuned better?

Evaluation

observing - perform the necessary maintenance on this machine

comparing - list the relative merits of the Big 3 autos

"kinestheticing" - what muscles are you now using?

Communication

demonstrating - describe the physical properties of this prototype

PSYCHOMOTOR

Acquisition

learning - practice disassembling and assembling this model

Application

effecting - machine this block of wood according to this pattern

constructing - set up this model display

Evaluation

templating - check the tolerances on this crankshaft

Communication

training - teach the apprentices how to construct a bookcase

APPENDIX C

Categories in Original Formulation

COGNITIVE

- Acquisition
  - perception
  - recording (registration)
    - encoding
    - storing
- Application
  - comprehension
    - translation
    - interpretation
    - extrapolation
      - classify
      - abstract
      - associate
- processing
  - organizing
  - analysis
  - synthesis
  - conceptualizing (invent, create)

Communication

verbal

teach

supervise

counsel (advise)

administer((manage)

question

answer

inform/explain

non-verbal

write

manipulate (demonstrate)

assemble

operate

troubleshoot

repair

Evaluation

judge

classify

determine

diagnose

PERCEPTUAL

Acquisition

sensing (deduction)

5 senses & kinesthetic

Acquisition (continued)

cue selection

registration

Application

classify

discriminate

differentiate

label

Communication

verbal

non-verbal

(See Cognitive breakdown)

Evaluation

compare

estimate

PSYCHOMOTOR

Acquisition

perception

stimulus

cue selection

registration

Application

set

comprehension

Application (continued)

processing

imitation

trial & error

Communication

verbal

non-verbal

gross

fine

(See Cognitive breakdown)

Evaluation

observation

AFFECTIVE

Acquisition

perception

internal

external

Application

internal

external (communicate)

verbal

non-verbal (psychomotor)

Communication

verbal

non-verbal

(See Cognitive Breakdown)

Evaluation

judge

value

APPENDIX D

Questions on the Range of Individual Differences in the High School and Techniques Used for Dealing with Diversity*

I. Grouping procedures (sometimes called "tracking")

1. Does your high school employ grouping procedures to deal with student diversity?

2. How many groupings are there? How do these vary by subject matter?

3. What curriculums (courses) are covered in the different groups? In what way are these similar and different in subject matter? In skill level?

4. What is the average class size of classes in the different groups?

5. What criteria are used for initial assignment of students to different groups in the various subject matters?

   a. What are the criterion indices (i.e., measures or judgments on which classification is based?

   b. What are the cutoff scores on these indices?

   c. How are these indices combined or weighted in making a grouping decision?

   d. How were these criteria determined (what basis)?

6. What procedures other than grouping are used for dealing with student diversity (e.g., programmed instruction, tutoring)?

II. Objective characteristics of the students in the different high school groupings

7. What is the dropout rate in the different groupings? The attendance rate?

8. What percentage of students move from each of the groups to higher groups during high school? What percentage move to lower groups?

9. What is the probability that a student will be in the same group across all subject matters?

10. What is the average score for students in each of the groups on standardized measures of achievement, and reading level at different grade levels?

11. What relative gains or losses do students in each of the groups show in achievement, intelligence, and reading level measured from high school entry to graduation?

12. Are the performances of students in the different groups more similar in the freshman or the senior years?

13. Is final student ranking in the graduating class influenced by the group that the student is in?

III. Self concept of students in the different groups (<u>there are no definite plans to collect this data at the present time</u>).

14. What do graduates of the different groups do upon graduation?

15. What are subjective impressions of self (self-worth, growth) among students in each of the groupings?

16. What are the attitudes of students in the different groups toward the education they are receiving?

17. What percentage of students in each group participate in extra-curricular activities? Who participates in what type of activities (i.e., student government, sports, publications)?

18. How many students in each group hold part-time jobs outside of school?

19. What are the expressed hobbies or outside interests of the students in different groups?

20. For students in different groups, what is the income level of the family? Number of other children in the family?

21. What are the expressed favorite subjects or school activities of students in different groups?

22. Does student motivation (as measured by grades, college entrance, jobs) differ among students in different groups?

23. Does the amount of teacher enthusiasm and affection for students change for different groups?

IV. The high school teacher and grouping

24. What performance expectations do teachers have for students in the different groups?

25. What kind of supervision do teachers receive relative to their dealing with the different groups?

26. Are the teachers aware of what is being covered in their area in the different groups and are they attempting to cover the same concepts at an appropriate level?

V. The educational system

27. Has grouping in your high school ever been evaluated?

28. Has heterogeneous grouping recently been tried in your high school? What were the outcomes?

29. How many innovations have been undertaken in your high school within the past five years? What were they?

30. How do your high school students compare to others on national norms?

* Based on answers to the above questions, we will attempt to draw conclusions about the effects of grouping on student performance.